

CAPLUS

L13 3145 S (PEM OR (POLYMER ELECTROLYTE MEMBRANE?))
L14 1732 S L13 AND (FUEL CELL?)
L15 2078 S (PEFC OR (POLYMER ELECTROLYTE FUEL CELL?))
L16 3300 S L14 OR L15

FILE 'CAPLUS, WPIDS' ENTERED AT 17:49:09 ON 30 MAY 2003
L17 1 FILE CAPLUS
L18 1 FILE WPIDS
TOTAL FOR ALL FILES
L19 2 S DE19705469/PN

FILE 'CAPLUS' ENTERED AT 17:50:08 ON 30 MAY 2003
L20 781 S L16 AND PLATINUM?
L21 278 S L20 AND NAFION?
L22 0 S L21 AND TERPINEOL?

FILE 'REGISTRY' ENTERED AT 17:54:48 ON 30 MAY 2003
E TERPINEOL/CN
L23 1 S E3

FILE 'CAPLUS' ENTERED AT 17:55:45 ON 30 MAY 2003
L24 5 S L21 AND ((NONPOLAR? OR (NON-POLAR?) OR (NON POLAR?) OR HYDRO
L25 5 FOCUS L24 1-

L25 ANSWER 1 OF 5 CAPLUS COPYRIGHT 2003 ACS
AN 1999:631497 CAPLUS
DN 131:259912
TI Membrane electrode assembly for **polymer electrolyte**
membrane fuel cell and method for its
manufacture
IN Zuber, Ralf; Fehl, Knut; Starz, Karl-anton; Stenke, Udo
PA Degussa-Huls A.-G., Germany
SO Eur. Pat. Appl., 13 pp.
CODEN: EPXXDW

DT Patent
LA German

IC ICM H01M008-10
ICS H01M004-92

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 37, 67

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|--|------|----------|------------------|----------|
| PI | EP 945910 | A2 | 19990929 | EP 1999-104630 | 19990309 |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO | | | | |
| | DE 19812592 | A1 | 19991007 | DE 1998-19812592 | 19980323 |
| | US 6309772 | B1 | 20011030 | US 1999-274018 | 19990322 |
| | JP 11329452 | A2 | 19991130 | JP 1999-77861 | 19990323 |
| | BR 9900605 | A | 20000606 | BR 1999-605 | 19990323 |
| PRAI | DE 1998-19812592 | A | 19980323 | | |

AB The membrane electrode assembly of the **fuel cell**
comprises a **polymer electrolyte membrane**
with porous reaction layers contg. catalysts and ionomers on both sides of
the membrane. The reaction layer has an inhomogeneous microstructure
formed from an ionomer-impregnated and embedded catalyst portion and an
ionomer-free catalyst portion in wt. ratio (1-20):1, esp. (3-10):1. The
catalyst can be carbon-supported Pt-group metal or alloy particles. The
reaction layer has pore vol. 0.7-1.3, esp. 0.8-1.2 mL/g, for pores with
diam. 0.03-1 .mu.m, and thickness 5-100, esp. 10-100 .mu.m. The ionomer
can be a proton-conducting tetrafluoroethylene-fluorovinylether copolymer
contg. acid groups, e.g., **Nafion**.

ST membrane electrode assembly **PEM fuel cell**;
polymer electrolyte membrane fuel
cell

IT Carbon black, uses

RL: CAT (Catalyst use); USES (Uses)
(catalyst supports; membrane electrode assembly for **polymer**
electrolyte membrane fuel cells)

IT Platinum-group metals

RL: CAT (Catalyst use); USES (Uses)
(catalysts; membrane electrode assembly for **polymer**
electrolyte membrane fuel cells)

IT Glycols, uses

RL: NUU (Other use, unclassified); USES (Uses)
(ethers, solvents; membrane electrode assembly for **polymer**
electrolyte membrane fuel cells)

IT Polyoxyalkylenes, uses

RL: DEV (Device component use); TEM (Technical or engineered material
use); USES (Uses)
(fluorine- and sulfo-contg., ionomers, proton-conducting; membrane
electrode assembly for **polymer electrolyte**
membrane fuel cells)

IT Polyoxyalkylenes, uses

RL: DEV (Device component use); TEM (Technical or engineered material
use); USES (Uses)

have

(fluorine-contg., sulfo-contg., ionomers, proton-conducting; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Ethers, uses
RL: NUU (Other use, unclassified); USES (Uses)
(glycol, solvents; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Fuel cell electrolytes
(polymer membranes; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Fuel cells
(polymer-electrolyte-membrane; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Fluoropolymers, uses
Fluoropolymers, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(polyoxyalkylene-, sulfo-contg., ionomers, proton-conducting; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Ionomers
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-contg., proton-conducting; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Fluoropolymers, uses
Ionomers
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(proton-conducting; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Alcohols, uses
Glycols, uses
Hydrocarbons, uses
Paraffin oils
RL: NUU (Other use, unclassified); USES (Uses)
(solvents; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Solvents
(weakly polar; nonpolar; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses
7440-16-6, Rhodium, uses
RL: CAT (Catalyst use); USES (Uses)
(catalysts; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT 77950-55-1, Nafion 115
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(membranes; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT 7439-89-6, Iron, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-18-8, Ruthenium, uses 7440-33-7, Tungsten, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-62-2, Vanadium, uses
RL: CAT (Catalyst use); USES (Uses)
(platinum group metals alloyed with, catalysts; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT 116-14-3D, Tetrafluoroethylene, fluorovinylether copolymers,

functionalized 57578-63-9D, Perfluorovinylether-tetrafluoroethylene copolymer, functionalized

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(proton-conducting; membrane electrode assembly for polymer electrolyte membrane fuel cells)

IT 56-81-5, 1,2,3-Propanetriol, uses 57-55-6, 1,2-Propanediol, uses
107-41-5, Hexylene glycol 110-38-3, Decanoic acid, ethyl ester
111-82-0, Dodecanoic acid, methyl ester 463-79-6D, Carbonic acid, alkyl esters, uses 25265-71-8, Dipropylene glycol
RL: NUU (Other use, unclassified); USES (Uses)
(solvents; membrane electrode assembly for polymer electrolyte membrane fuel cells)

RN 7440-05-3
RN 7440-06-4
RN 7440-16-6
RN 77950-55-1
RN 7439-89-6
RN 7439-98-7
RN 7440-02-0
RN 7440-18-8
RN 7440-33-7
RN 7440-47-3
RN 7440-48-4
RN 7440-50-8
RN 7440-62-2
RN 116-14-3D
RN 57578-63-9D
RN 56-81-5
RN 57-55-6
RN 107-41-5
RN 110-38-3
RN 111-82-0
RN 463-79-6D
RN 25265-71-8

L25 ANSWER 2 OF 5 CAPLUS COPYRIGHT 2003 ACS

AN 1994:659704 CAPLUS

DN 121:259704

TI Manufacture of solid polymer electrolyte fuel cells

IN Seki, Tsutomu

PA Tokyo Gas Co Ltd, Japan

SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M008-02

ICS H01M004-86; H01M004-88; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| PI | JP 06203849 | A2 | 19940722 | JP 1992-358059 | 19921225 |
| PRAI | JP 1992-358059 | | 19921225 | | |

AB The fuel cells are prep'd. by mixing carbon black loaded Pt catalyst and a ion exchanger resin used as solid polymer electrolyte in a solvent to form a suspension, depositing the suspension on hydrophobically treated substrates to form electrode sheets, holding an ion exchanger polymer electrolyte membrane between an electrode sheet pair, and hot pressing.

ST solid polymer electrolyte fuel cell

✓? What is the solvent?

; polymer electrolyte fuel cell
manuf

IT Fuel cells
(manuf. of solid polymer electrolyte fuel
cells)

IT Carbon black, uses
RL: CAT (Catalyst use); DEV (Device component use); USES (Uses)
(manuf. of solid polymer electrolyte fuel
cells)

IT 7440-06-4, Platinum, uses
RL: CAT (Catalyst use); DEV (Device component use); USES (Uses)
(manuf. of solid polymer electrolyte fuel
cells)

IT 66796-30-3, Nafion 117
RL: DEV (Device component use); TEM (Technical or engineered material
use); USES (Uses)
(manuf. of solid polymer electrolyte fuel
cells)

RN 7440-06-4

RN 66796-30-3

L25 ANSWER 3 OF 5 CAPLUS COPYRIGHT 2003 ACS
AN 1994:659705 CAPLUS
DN 121:259705
TI Manufacture of solid polymer electrolyte fuel
cells
IN Seki, Tsutomu
PA Tokyo Gas Co Ltd, Japan
SO Jpn. Kokai Tokkyo Koho, 4 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01M008-02
 ICS H01M004-86; H01M004-88; H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| PI | JP 06203848 | A2 | 19940722 | JP 1992-358058 | 19921225 |
| PRAI | JP 1992-358058 | | 19921225 | | |

AB The fuel cells are prep'd. by mixing carbon black loaded Pt catalyst and a ion exchanger resin used as solid polymer electrolyte in a solvent to form a slurry, applying the slurry to a hydrophobically treated electrode substrate, removing the solvent by evapn. to form an electrode sheet, and hot pressing an ion exchanger membrane between a pair of the electrode sheets.

ST solid polymer electrolyte fuel cell
; polymer electrolyte fuel cell
manuf

IT Fuel cells
(manuf. of solid polymer electrolyte fuel
cells)

IT Carbon black, uses
RL: CAT (Catalyst use); DEV (Device component use); USES (Uses)
(manuf. of solid polymer electrolyte fuel
cells)

IT 7440-06-4, Platinum, uses
RL: CAT (Catalyst use); DEV (Device component use); USES (Uses)
(manuf. of solid polymer electrolyte fuel
cells)

IT 66796-30-3, Nafion 117
RL: DEV (Device component use); TEM (Technical or engineered material
use); USES (Uses)

(manuf. of solid polymer electrolyte fuel cells)

RN 7440-06-4
RN 66796-30-3

L25 ANSWER 4 OF 5 CAPLUS COPYRIGHT 2003 ACS
AN 1996:388536 CAPLUS
DN 125:38070
TI Manufacture of electrodes for solid polymer electrolyte fuel cells
IN Tada, Tomoyuki
PA Tanaka Precious Metal Ind, Japan; Watanabe Masahiro; Sutonharuto Asosheetsu Inc
SO Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01M004-88
ICS B01J037-00; B01J037-02; H01M004-86; H01M008-02; H01M008-10
ICA B01J023-42
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAN.CNT 4

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|--|------|----------|-----------------|----------|
| PI | JP 08115726 | A2 | 19960507 | JP 1994-277108 | 19941017 |
| | US 5843519 | A | 19981201 | US 1995-543632 | 19951016 |
| PRAI | JP 1994-277108 | | 19941017 | | |
| | JP 1994-332291 | | 19941017 | | |
| | JP 1994-289288 | | 19941028 | | |
| | JP 1994-289289 | | 19941028 | | |
| AB | The electrodes are prep'd. by spray drying a dispersion of ground catalyst particles in an org. solvent, contg. ion exchanger resin and optionally a hydrophobic resin, to obtain resin coated catalyst granules and applying the granules on a substrate to form a catalyst layer. Preferably, the ground catalyst particles have diam. 0.1-10 .mu.m, the granules have diam. 1-50 .mu.m, the dispersion contains 0.5-15% solids, the spraying is carried out at 90-160.degree. and 0.8-1.5 kg/cm ² spraying pressure, and the solvent has b. ltoreq. 160.degree.. | | | | |
| ST | solid polymer electrolyte fuel cell electrode; fuel cell electrode catalyst resin coating; electrode catalyst ion exchanger coating; hydrophobic resin coating electrode catalyst | | | | |
| IT | Polyoxyalkylenes, uses RL: NUU (Other use, unclassified); USES (Uses) (fluorine- and sulfo-contg., ionomers, manuf. of Nafion coated catalyst granules contg. platinum loaded on carbon support for solid polymer electrolyte fuel cell electrodes) | | | | |
| IT | Electrodes (fuel-cell, manuf. of Nafion coated catalyst granules contg. platinum loaded on carbon support for solid polymer electrolyte fuel cell electrodes) | | | | |
| IT | Fluoropolymers RL: NUU (Other use, unclassified); USES (Uses) (polyoxyalkylene-, sulfo-contg., ionomers, manuf. of Nafion coated catalyst granules contg. platinum loaded on carbon support for solid polymer electrolyte fuel cell electrodes) | | | | |
| IT | Ionomers RL: NUU (Other use, unclassified); USES (Uses) (polyoxyalkylenes, fluorine- and sulfo-contg., manuf. of Nafion coated catalyst granules contg. platinum loaded on carbon support for solid polymer electrolyte fuel cell electrodes) | | | | |

IT Drying
(spray, spray drying in manuf. of Nafion coated catalyst granules contg. platinum loaded on carbon support for solid polymer electrolyte fuel cell electrodes)

IT 7440-06-4, Platinum, uses 7440-44-0, Carbon, uses
RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process);
PROC (Process); USES (Uses)
(manuf. of Nafion coated catalyst granules contg.
platinum loaded on carbon support for solid polymer
electrolyte fuel cell electrodes)

RN 7440-06-4

RN 7440-44-0

L25 ANSWER 5 OF 5 CAPLUS COPYRIGHT 2003 ACS
AN 1999:392852 CAPLUS
DN 131:33839
TI Fuel cell electrodes and their manufacture
IN Yamada, Hiroshi
PA Tokyo Gas Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01M004-86
 ICS H01M004-88; H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| PI | JP 11167925 | A2 | 19990622 | JP 1997-365849 | 19971222 |
| PRAI | JP 1997-284428 | | 19971001 | | |

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AB The electrodes have a catalyst layer, formed on a porous gas diffusion layer, and are prep'd. by evapg. a solvent from a suspension contg. catalyst particles, an electrolyte, and a hydrophobic agent under controlled temp. and pressure to maintain an evapn. rate of apprx. 8 cm³/min. The catalyst is preferably Pt, Pd, and/or their alloy loaded on C particles; the electrolyte is a perfluorocarbon sulfonic acid; the hydrophobic agent is polytetrafluoroethylene; the solvent is water and/or alc.; and the fuel cells are polymer electrolyte fuel cells.

ST fuel cell electrode catalyst layer manuf; evapn control fuel cell electrode manuf

IT Evaporation
Fuel cell electrodes
(controlled evapn. of solvents in manuf. of catalyst layers for polymer electrolyte fuel cell electrodes)

IT Carbon black, uses
RL: CAT (Catalyst use); USES (Uses)
(controlled evapn. of solvents in manuf. of catalyst layers for polymer electrolyte fuel cell electrodes)

IT Fluoropolymers, uses
RL: DEV (Device component use); USES (Uses)
(controlled evapn. of solvents in manuf. of catalyst layers for polymer electrolyte fuel cell electrodes)

IT 7440-06-4, Platinum, uses
RL: CAT (Catalyst use); USES (Uses)
(controlled evapn. of solvents in manuf. of catalyst layers for polymer electrolyte fuel cell electrodes)

IT 9002-84-0, Polytetrafluoroethylene 66796-30-3, Nafion 117
RL: DEV (Device component use); USES (Uses)
(controlled evapn. of solvents in manuf. of catalyst layers for
polymer electrolyte fuel cell
electrodes)

IT 64-17-5, Ethanol, processes 7732-18-5, Water, processes
RL: REM (Removal or disposal); PROC (Process)
(controlled evapn. of solvents in manuf. of catalyst layers for
polymer electrolyte fuel cell
electrodes)

RN 7440-06-4
RN 9002-84-0
RN 66796-30-3
RN 64-17-5
RN 7732-18-5

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